**N111: Pharmacology Blue Print Exam-1**

**Chapter 7:**

**Pregnancy Drug Categories (Table 7.1) 1**

**Risk Category-**

**A-**adequate, well- controlled studies in pregnant women have not shown an increased risk of fetal abnormalities to the fetus in any trimester of pregnancy

* Prenatal Vitamins
* Insulin
* Thyroxin
* Folic Acid

**B-** Animal studies have revealed no evidence of harm to the fetus, however there are no adequate, well controlled studies in pregnant women OR Animal studies have shown an adverse effect, but adequate and well controlled studies in women have failed to demonstrate risk to the fetus in any trimester

* penicillins
* cephalosporins
* azithromycin
* acetaminophen
* ibuprofen in the second trimester

**C**- Animal studies have shown in adverse effect and there are no adequate and controlled studies in pregnant women OR No animal studies have been conducted and there are no adequate and well controlled studies in pregnant women

* Most prescription medications
* Antimicrobials
* selective serotonin reuptake inhibitors
* corticosteroids
* and most antihypertensive

**D**- Adequate well controlled or observational studies in pregnant women have demonstrated a risk to the fetus however the benefits of therapy may outweigh the potential risk. Ex: The drug may be acceptable if needed in a life-threatening situation or serious disease for which safer drugs cannot be used or are ineffective)

* ACE inhibitors [pharmaceutical drug](http://en.wikipedia.org/wiki/Pharmaceutical_drug) used primarily for the treatment of [hypertension](http://en.wikipedia.org/wiki/Hypertension) (high blood pressure) and [congestive heart failure](http://en.wikipedia.org/wiki/Congestive_heart_failure)
* Angiotensin receptor blockers (ARBs) **a** group of pharmaceuticals which modulate the [renin-angiotensin-aldosterone system](http://en.wikipedia.org/wiki/Renin-angiotensin-aldosterone_system). Their main uses are in the treatment of [hypertension](http://en.wikipedia.org/wiki/Hypertension) (high blood pressure), [diabetic nephropathy](http://en.wikipedia.org/wiki/Diabetic_nephropathy) (kidney damage due to [diabetes](http://en.wikipedia.org/wiki/Diabetes_mellitus)) and [congestive heart failure](http://en.wikipedia.org/wiki/Congestive_heart_failure).
* Gentamicin
* Ibuprofen in the third trimester
* Tetracyclines
* Premarin
* Alcohol
* Nicotine

**X**- Adequate well controlled or observational studies in animals or pregnant women have demonstrated positive evidence of fetal abnormalities or risk. The use of the product is contraindicated in women who are or may become pregnant. There is no indication for use in pregnancy.

* Accutane
* Misoprostol
* Thalidomide

**Pharmacotherapy of Infants/Toddlers** 1

**Infants-**(birth to 12 months, the first 28 days of life are referred to as neonatal period)

* + The infant should be held or cuddled while administering meds, and offered a pacifier if the infant is on fluid restrictions caused by vomiting or diarrhea
  + Oral meds should be directed into the inner cheek and the child given some time to swallow the drug to avoid aspiration.
  + If rectal suppositories are administered, the buttocks should be held together for 5 to 10 min to prevent expulsion of the drug before absorption has occurred
  + Special considerations must be observed when administering intramuscular (IM) or intravenous (IV) injections to infants. (For volumes less than 1mL a tuberculin syringe is appropriate.) The vastus lateralis (upper/outer thigh) is the preferred location for IM injections
  + To avoid over use of injection sites the nurse must alternate between legs
  + For IV sites the feet and scalp veins may provide more easily accessible and preferred venous access sites

**Toddlers- (**1 to 3 yoa) Giving long, detailed explanations to the toddler will only prolong the procedure and create additional anxiety. Nurses should educate the parents about the fallowing means of protecting their children from poisoning:

* Read and carefully fallow directions on the label before using drugs and OTC products
* Store all drugs and harmful agents out of the reach of children and in locked cabinets
* Keep all household products and drugs in their original containers. Never put chemicals in empty food or drink containers
* Always ask the pharmacist to place the meds for everyone in the household in child proof containers
* NEVER tell children medication is candy
* Keep the poison control number near phones, and call immediately if poisoning is suspected
* Never leave meds unattended in a child’s room or in areas where the child plays

**Chapter8:**

**Genetic influences on pharmacotherapy** 1

* A single base mutation in DNA may result in amino acid change in the enzymes, which alters its function. This creates **a genetic polymorphism- two or more versions of the same enzyme**. The best genetic polymorphisms have been discovered in enzymes that metabolize drugs and in proteins that serve as receptors for drugs.
* Pharmacogenetics- the study of genetic variations that give rise to the differences in the way patients handle meds.

**Gender influence on Pharmacotherapy**

* Several different drugs can cause gynecomastia, an increase in breast size which can be embarrassing for some males.
* Certain drugs can cause masculine side effects such as increased hair growth which can lead to non adherence in women taking the drug
* Local and systemic responses to some meds can differ between genders could be due to:
  + Body composition fat-to-muscle ratio
  + Cerebral blood flow varies between males and females

**Chapter 9:**

**Factors contributing to medical errors** 2

* Omitting one of the rights of drug administration. (Common errors incorrect dose, not giving an ordered dose, and giving the wrong dose)
* Failing to perform an agency check. Both pharmacist and nurses must collaborate on checking the accuracy and appropriateness of drug orders prior to administering drugs to pts
* Failing to account for pt variables such as age, body size, and impairment in renal or hepatic function
* Giving meds based on verbal orders or phone orders, which may be misinterpreted or go undocumented
* Giving meds based on an incomplete order or an illegible order, when the nurse is unsure of the correct drug, dosage, or administration method
* Practicing under stressful work conditions
* Taking drugs prescribed by several practitioners without informing each of their health care providers about all prescribed meds
* Getting their prescription filled at more than one pharmacy
* Not filling or refilling their prescriptions
* Taking meds incorrectly
* Taking meds that may have been left over from a previous illness or prescribed for something else

**Strategies for reducing medical errors** 2

* Assessment-
  + Allergies about food or meds
  + Current health concerns
  + OTC meds
  + Herbal supplements
  + Ensure that the pt has been receiving the right dose , at the right time, and by the right route
  + Assess kidney, liver, and other body system functions Identify areas of needed pt education
* Planning-
  + Minimize factors that contribute to med errors
  + Avoid using abbreviations
  + Question unclear orders
  + Do not accept verbal orders
  + Have the pt restate dosing directions, including dose, time, and route
* Implementing-
  + Eliminate potential distractions during medication administration that could result in error
  + Focus entirely on the task
  + Practice the rights of medication administration: right pt, right time and frequency of administration, right dose, right route, and right drug
    - Positively verify the identity of each pt using 2 means
    - Use correct procedures and techniques for all routes of administration. Use sterile materials and aseptic techniques when administering parenteral or eye medication
    - Calculate med dosages correctly and measure liquid drugs carefully. Always double check peds calculations prior to administration
    - Open meds immediately prior to administering the meds and in the presence of the pt
    - Record the meds on the MAR immediately after administration
    - Always confirm that the pt has swallowed the meds
    - Be alert for long-acting oral dosage forms with indicators such as LA, XL, and XR.
* Evaluation:
  + Assess the pt for expected outcomes and determine if any adverse effects have occurred

**Categories of medication errors**  2

* Category A: Circumstances or events that have the capacity to cause error
* Category B: An error occurred but did not reach the pt
* Category C: An error occurred that reached the pt but did not cause the pt harm
* Category D: An error occurred that reached the pt and required monitoring to confirm that it resulted in no harm to the pt and/or required intervention to preclude harm
* Category E: An error occurred that may have contributed to or resulted in temporary harm to the pt and required intervention
* Category F: An error occurred that may have contributed to or resulted in temporary harm to the pt and required initial or prolonged hospitalization
* Category G: An error occurred that may have contributed to or resulted in permanent pt harm
* Category H: An error occurred that required intervention necessary to sustain life
* Category I: An error occurred that may have contributed to or resulted in the pt’s death

**Importance of policies and procedures**  1

* Provide guidance on reporting medication errors. Should occur in a factual manor. Important for both the institution and employees to have a set of guidelines of what should be done under certain circumstances.

**The impact of medication errors** 1

* Most common cause of morbidity and preventable deaths in hospitals
* The repercussions can be emotionally devastating for the nurse and pt involved
* Can lengthen the pt’s stay in the hospital
* The nurse or dr may suffer from self-doubt and embarrassment
* The reputation of the facility may suffer

**Reporting and documenting medication error** 1

* A nurse’s legal and ethical responsibility to report all medication errors
* The FDA has coordinated the reporting of medication errors at the federal level. The program MedWatch provides important and timely clinical information about safety issues involving medical products, including prescription and OTC drugs, biologics, medical and radiation-emitting devices, and special nutritional products.
* Since 1992 the FDA has received over 30,000 reports of medication errors
* NCC MERP coordinates information on medication errors and provides medication error prevention education

**Documenting in the patient’s medical record/importance** 1

* Documenting in the medical record must include specific nursing interventions that were implemented following the error to protect pt safety, such as monitoring vital signs and assessing the pt for possible complications
* In addition to documenting in the pts medical record the nurse must complete an incident report (must be recorded in a factual and objective manor.
* Legal issues may worsen if there is an attempt to hide a mistake or delay corrective action, or if the nurse forgets to document interventions in the pts chart

**Medication errors** 1

* Any preventable event that may cause or lead to inappropriate medication use or pt harm while the medication is in control of the health care professional, pt, or consumer
* Related to
  + Misinterpretations
  + Miscalculations
  + Misadministration
  + Handwriting misinterpretations
  + Misunderstanding of verbal or phone errors

**Chapter 13**

**Autonomic nervous system “automatic nervous system” 1**

* Most organs and glands receive nerves from both divisions of the ANS
* All ANS drugs either:
  + Stimulate-the system does more than what it normally does
  + Inhibit- block the system to do less than what it normally does
* The two primary neurotransmitters of the ANS are norepinephrine and acetylcholine
  + Only acetylcholine in the sweat glands
* Divided into 2 sections
  + Sympathetic nervous system- is activated under conditions of stress and produces a set of actions called the “fight or flight response”
    - Heart rate and BP rises
    - More blood is shunted to skeletal muscle
    - The liver immediately produces more glucose for energy
    - The bronchi dilate to allow more air into the lungs
    - Pupils dilate for better vision
  + Parasympathetic nervous system- is activated under nonstressful conditions and produces symptoms called the “rest and digest response”
    - Digestive processes are promoted
    - Heart rate and BP decline
    - Not as much air is needed so the bronchi constrict
* Communication in the ANS involves the connection of two neurons, in series.
* Comprised of motor neurons

**Sympathetic nervous system** 1

* Sympathetic nervous system- is activated under conditions of stress and produces a set of actions called the “fight or flight response”
  + Heart rate and BP rises
  + More blood is shunted to skeletal muscle
  + The liver immediately produces more glucose for energy
  + The bronchi dilate to allow more air into the lungs
  + Pupils dilate for better vision
* The constriction of arterioles is controlled entirely by the sympathetic branch
* Sweat glands are controlled only by sympathetic nerves

**Adrenergic receptor activation/agonist aka sympathomimetics (**fight or flight/adrenaline)2

* Stimulation of the sympathetic nervous system
* Adrenergic receptors- the receptor at the end of the postganglionic sympathetic neurons
  + Alpha receptor- alpha 1 and alpha 2
    - Neurotransmitter-norepinephrin
    - Typically stimulation of an alpha receptor results in vasoconstriction and CNS stimulation
      * Alpha1
        + Vasoconstriction and dilation of pupils
        + All sympathetic organs except for the heart
      * Alpha2
        + Inhibits the release of norepinephrin
        + Presynaptic adrenergic nerve terminals
  + Beta receptor- beta 1 and beta 2
    - Neurotransmitter- epinephrine
    - Stimulation of a beta adrenergic receptor results in cardiac stimulation, relaxation of bronchi, GI tract, and uterine muscles, and glycogenolysis (breakdown of glycogen)
      * Beta1
        + Increased heart rate and forced contraction, release of rennin
        + Heart and kidneys
      * Beta2
        + Inhibition of smooth muscle
        + All sympathetic organs except the heart

**Adrenergic antagonist –aka sympatholytics**, **alpha blocker, and beta blocker** 1

* Inhibit or block of the SNS (sympathetic nervous system)
* Produce many of the same effects as cholinergic effects
  + COUNTERACT FIGHT OR FLIGHT MECHANISMS
  + Cause rest and digest symptoms
* Wide therapeutic application for the treatment of hypertension (high BP)
* They act directly by blocking the adrenergic receptors
  + Alpha or beta blockers

**Beta Agonist/use 1**

* Block the stimulation of beta receptors
* Selective or nonselective beta blockers
  + Cardiovascular beta blockers (only effect the heart)
  + Nonspecific beta blockers (effect both heart and cause bronchioles to constrict)
* All beta blockers are used for their effects on the cardiovascular system
  + They decrease the rate and force of contractions of the heart and slow electrical conduction through the AV node
  + They are mainly used to treat hypertension, but can also be used as a cardio protective and can treat migraines, angina (chest pain), certain dysrythmias ,HF, MI, and glaucoma

**Beta blockers/precautions 2**

* Any drug that can lower your BP can lower it too much!!
* Precautions:
  + Change positions slowly
  + Avoid caffeine
  + Avoid alcohol and hazardous activities
  + Report any side effects
  + Don’t stop abruptly
  + Monitor for therapeutic and adverse effects
* Assess history of:
  + COPD or asthma
  + Hypotension
  + Cardiac dysrythmias
  + Heart failure

**Beta blockers atenolol, metaprolol (selective)/adverse effects 2**

* Selective=beta 1=only the heart
* Side effects:
  + Bradycardia-heart beats too slowly, you may become tired, dizzy or pass out
  + Heart failure
  + Pulmonary edema-is an abnormal buildup of fluid in the air sacs of the lungs, which leads to shortness of breath
  + Hypotension-low BP
  + Fatigue
  + Dizziness
  + Depression
  + Lethargy
  + Nausea, vomiting, or diarrhea
  + Impotence

**Beta blockers (non-selective) propranolol/adverse effects 1**

* Nonselective=beta 1 and beta 2= effect both the heart and lungs
* Symptoms:
  + All the side effects of selective beta blockers PLUS
  + Bronchospasms (asthma-like symptoms)
  + Life-threatening skin side effects
    - * Erythema multiforme
      * Exfoliative dermatitis
      * Stevens-Johnson syndrome
      * Toxic epidermal necrolysis

**Anti-cholinergic drug/contraindication aka parasympathomimetics 3**

* Drugs that block or inhibit actions of acetylcholine ( **ACh is a NT in the SNS, PSNS, and skeletal muscle**) in PSNS (parasympathetic nervous system) induces fight or flight response
* Will cancel out an excess of cholinergic agonists
* Drug effects:
  + Cardiovascular
    - Small doses decrease heart rate
    - Larger doses increase heart rate
  + CNS
    - Small doses decrease muscular rigity/tremors (treat Parkinson’s)
  + Eyes
    - Dilates pupils
  + GU
    - Urinary retention (treats incontinence)
  + GI
    - Decreases secretions (used pre-op)
    - Decreases motility and peristalsis (spasms)
  + Respiratory
    - Decreased bronchial secretions
    - Dilated bronchial airways (preventative in asthma)
* Side Effects:
  + CV
    - Increased hr
    - Dysrhythmia- irregular heartbeat
    - Ischemia- a restriction in blood supply to [tissues](http://en.wikipedia.org/wiki/Tissue_%28biology%29), causing a shortage of [oxygen](http://en.wikipedia.org/wiki/Oxygen) and [glucose](http://en.wikipedia.org/wiki/Glucose) needed for [cellular metabolism](http://en.wikipedia.org/wiki/Cellular_metabolism)
  + CNS
    - Stimulation
  + Eyes
    - Dilated pupils
    - Blurred vision
    - Increased intravascular pressure
  + GI
    - Decreased salvation
    - Decreased gastric secretions
    - Decreased motility (constipation)
  + GU
    - Urinary retention
  + Glandular
    - Decreased sweating (can lead to heat stroke)
  + Respiratory
    - Decreased bronchial secretions

**Cholinergic agonist aka parasympathomimetics /side effect/myasthenia gravis 1**

* Drugs that stimulate the parasympathetic nervous system produce symptoms of rest and digest
  + Increases secretions (salivating and sweating)
  + Increases peristalsis- a series of organized muscle contractions that occur throughout the digestive tract
* Receptors:
  + Two types determined by
    - Location
    - Action where stimulated
  + Nicotinic receptors: cholinergic receptors that are stimulated initially and blocked at high doses by the alkaloid nicotine and blocked by tubocurarine; they are found on automatic ganglion cells, on striated muscle cells, and on spinal central neurons.
  + Muscarinic receptors:  cholinergic receptors that are stimulated by the alkaloid muscarine and blocked by atropine; they are found on automatic effector cells and on central neurons in the thalamus and cerebral cortex.
  + Vangus Nerve is involved
* Mechanisms of action
  + Direct acting cholinergic agonist (myasthenia gravis)
    - Bind to cholinergic receptors to produce rest and digest response
    - Longer lasting effect (more resistant to acetylcholinesterase-the enzyme that breaks down ACh) **ACh is a NT in the SNS, PSNS, and skeletal muscle**
    - Direct acting agents=moderately selective= muscarinic agonists(most commonly used when it is desirable to increase smooth muscle tone, especially in the GI tract, urinary bladder and the eye. They may also be used to reduce heart rate)
  + Indirect-acting agents
    - Inhibit the action of acetylcholinesterase allowing endogenous (natural) ACh to not be destroyed
    - HELP PROLONG THE ACTION OF THE BODYS OWN ACh
    - Indirect-acting agents=nonselective=cholinesterase inhibitors
    - Clinical Use:
      * Limited due to serious adverse effects
      * Ophthalmological use(glaucoma)
      * Increase bladder/GI motility
      * Reverse neuromuscular blocking anesthetics
      * Reverse anticholinergic poisoning
      * Used to treat myasthenia gravis
      * Used to treat alzheimer’s
    - Side effects:
      * “Sludge”
        + S-salvation
        + L-lacrimation (abnormal or excessive secretion of tears)
        + U- Urinary Incontinence
        + D- Diarrhea
        + E- Emesis (vomiting)

**Chapter 18**

**Nonpharmacological Techniques for Pain Management** 2

* Assists pts in obtaining adequate pain relief
* May be used with or without pharmacotherapy
* May result in lower dosages of drugs and/or fewer drug-related adverse effects
* Some techniques:
  + Acupuncture
  + Biofeedback therapy
  + Message
  + Heat or cold packs
  + Meditation or prayer
  + Relaxation theropy
  + Art and music therapy
  + Imagery
  + Chiropractic manipulation
  + Hypnosis
  + Therapeutic or physical touch
  + Transcutaneous electrical nerve stimulation (TENS)
  + Energy Therapy (Reiki or Qi)
  + Radiation Therapy(relieves pain by shrinking tumors which may be pressing on nerves)

**Neural Mechanism of control/Substance P / Aδ and C fiber 3**

* The process of pain transmission begins when pain receptors are stimulated. These pain receptor are called nociceptors(free nerve endings located throughout the body)
* The nerve impulse is sent to the brain from the spinal cord by two types of fibers:
  + Aδ fiber:
    - Thinly wrapped in myelin(a lipid substance that speeds up nerve transmission)
    - Signal sharp, well-defined pain (**somatic**)
  + C fibers
    - Unmyelinated –thus they carry information more slowly to the brain
    - Conduct dull, poorly localized pain (**visceral**)
* Substance P- the NT thought to be responsible for transmitting the pain signal to the next set of neurons
  + May be effected by other NT released from neurons located in the CNS

**Treatment for opioid dependence 1**

* Methadone does not give symptoms of euphoria, so it treats the addiction by preventing against withdrawal symptoms to allow the pt to regain function
* Buprenorphine(Subutex)-a mixed opioid agonist-antagonist

**Narcotic: Morphine/mechanism of action/side effects 2**

* Action and Uses
* Binds with both Mu and Kappa receptor sites to produce profound analgesia
* Causes:
  + - Euphoria
    - Constriction of the pupils
    - Stimulation of cardiac muscles
* Uses:
  + - Symptomatic relief of serious acute and chronic pain after non-narcotic analgesics have failed
    - A preanesthetic medication
    - To relieve shortness of breath due to heart failure and pulmonary edema
    - Acute chest pain connected to MI
* Adverse Effect
  + Dysphoria(restlessness, depression, anxiety)
  + Hallucinations
  + Nausea
  + Constipation
  + Dizziness
  + Itching sensation
  + Overdose-results in cardiac arrest
* Treatment-IV administration of naloxone, activated charcoal, laxitives, counteracting narcotic antagonists
  + Tolerance develops to the sedative, nausea, and euphoric effects of the drug(as well as cross tolerance between morphine and other opioids)
  + Dependence- both physical and psychological

**Opioid Antagonist action/mechanism 1**

* Opioid antagonists are substances that prevent the effects of opioid agonists(many drugs because they compete with the opioids for access of the opioid receptor)

**Pharmacotherapy with NSAIDS 1**

* Inhibit cyclooxygenase-an enzyme responsible for the formation of prostaglandins (results in inflammation and pain reduction)
* Drug of choice for mild to moderate pain, especially for pain associated with inflammation
* Have antipyretic (reduces fever) and anti-inflammatory activity, as well as analegesic properties

**Classisication of Opioid receptor 1**

* 6 types of receptors:
  + Mu 1
  + Mu 2
  + Kappa
  + Sigma
  + Delta
  + Epsilon
* Mu and Kappa are the most important in pain management
  + Mu:
    - Analgesia
    - Decreased GI ability
    - Respiratory depression
    - Sedation
    - Physical dependence
  + Kappa:
    - Analgesia
    - Decreased GI motility
    - Sedation

**Opioid adverse effects 1**

* Pruritis (itching)
* Constipation
* Nausea
* Sedation
* Drowsiness
* Dizziness

**Migraine Headache? 1**

Most painful type of headache

Throbbing or pulsating pain

Sometimes preceded by auras(sensory cues that let the pt know a migraine attck is coming

Jagged lines

Flashing lights

Special smells, sounds, or tastes

Accompanied by nausea and vomiting

**Migraine Headache/Sumatriptan/Adverse effect 1**

* PO 25mg for 1 dose (max:100mg)
* Adverse effects:
  + Asthenia(weakness)
  + Tingling
  + Warming sensation
  + Dizziness
  + Vertigo(a sensation of whirling or loss of balance)

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**Chapter 33**

**Role of chemical mediators in inflammation 1**

* Damaged tissue releases chemical mediators that act as “alarms” to notify the surrounding area of the injury, whether it is from pathogens,chemical, or physical trauma)
* Chemical mediators include:
  + Histamine- a key chemical mediator of inflammation.
    - Stored in the mast cells located in tissue space under epithelial tissue, such as the skin, bronchial tree, digestive tract, and along blood vessels .
    - Mast cells detect foreign agents or injury and respond by releasing histamine.
  + Leukotrienes
  + Bradykinin
  + Complement
  + Prostaglandins
* Cellular injury -> mast cell -> release of chemical mediator ->
  + Vasodilation(redness,heat)->
  + Vascular permeability(edema)->
  + Cellular infiltration(pus) ->
  + Thrombus(clots)->
  + Stimulation of nerve ending(pain)

**NSAIDs/labs to monitor/maximum dose 2**

* Monitor:
  + Renal function
  + Possible kidney toxicity
  + AST and ALT(measures the amount of this [enzyme](http://www.webmd.com/hw-popup/enzyme) in the [blood](http://www.webmd.com/heart/anatomy-picture-of-blood)) may increase bleeding time and decrease hemoglobin and hemacrit
* Max dose:
  + Asprin-4g/day
  + Ibuprofen- 3.2g/day
  + Naproxen-1g/day
  + Celebrex-0.8g/day

**Treating acute or severe inflammation with glucocorticoid/adverse effect 2**

* Glucocorticoids- natural hormones released by the adrenal cortex
* When used as a drug the doses are many times higher than those naturally present in the body
* Inhibit the biosynthesis of prostaglandins
* Affect inflammation by multiple mechanisms
  + Suppress histamine release
  + Inhibit certain functions of phagocytes and lymphocytes
* Adverse Effects:
  + Suppress normal function of the adrenal gland
  + Hyperglycemia
  + Mood changes
  + Cataracts
  + Peptic ulcers
  + Electrolyte imbalance
  + Osteoporosis

**Fever/Acetaminophen/mechanism of action** 1

* Fever-natural defense mechanism for neutralizing foreign organisms
* Antipyretics-drugs used to treat fever
  + Effects of high fever
    - Young children
      * Febrile seizures
    - Adults
      * Break down body tissue
      * Reduce mental acuity
      * Lead to delirium or coma
      * May be fatal
* Acetaminophen:
  + Actions and uses:
    - Reduces fever by acting with the hypothalamus and dialation of peripheral blood vessels
      * Enables sweating and disapation of heat
    - No anti-inflamatory effects
    - Relief of mild to moderate pain
  + Adverse Effects:
    - Toxicity in pts who are malnourished (signs include nausea, vomiting, chills, abdominal discomfort, and fatal hepatic necrosis)
    - Liver damage